

What is claimed is:

1. An apparatus for reading indicia from a remote location, comprising:
a light source for providing illumination;
a reflective medium disposed remotely from the light source, the reflective medium
including indicia operable to reflect the illumination provided by the light
source, where portions of the illumination reflected from the indicia comprise
a reflected indicia image;
a light sensing device disposed remotely from the reflective medium, the light
sensing device for receiving the reflected indicia image and for generating an
indicia image signal based thereon; and
an indicia processing system for receiving the indicia image signal and for operating
on the indicia image signal to extract indicia information therefrom.
2. The apparatus of claim 1 wherein the light source provides infrared illumination
within a wavelength range of about 770 to 1100 nanometers.
3. The apparatus of claim 2 wherein the light source provides the infrared illumination
in a pulse having a pulse width ranging from about 0.1 to 1.5 milliseconds.
4. The apparatus of claim 3 wherein the light sensing device is sensitive to the infrared
illumination provided by the light source and is electronically shuttered in
synchronism with the pulse of infrared illumination provided by the light source.
5. The apparatus of claim 2 further comprising an optical filter disposed between the
light sensing device and the reflective medium, the optical filter for attenuating
optical radiation outside of a desired range of infrared wavelengths.
6. The apparatus of claim 2 wherein the light source further comprises an array of
infrared light emitting diodes.

7. The apparatus of claim 6 wherein the light source further comprises a driving circuit for driving the array of infrared light emitting diodes with current pulses having pulse amplitudes of about 1000 milliamperes.
8. The apparatus of claim 2 wherein the light source further comprises an infrared laser light source.
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9. The apparatus of claim 2 further comprising a cover over the reflective medium which is transmissive to infrared light and non-transmissive to visible light, such that the indicia on the reflective medium beneath the cover are substantially undetectable to human eyesight.
10. The apparatus of claim 2 further comprising graphic components over the reflective medium which are transmissive to infrared light and non-transmissive to visible light, such that the indicia on the reflective medium beneath the graphic components are substantially undetectable to human eyesight.
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11. The apparatus of claim 10 wherein the graphic components comprise alphanumeric characters.
12. The apparatus of claim 10 wherein the graphic components comprise a decoy bar code.
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13. The apparatus of claim 1 wherein the light sensing device further comprises a camera incorporating charge-coupled devices.
14. The apparatus of claim 1 wherein the reflective medium is disposed at least 5 feet away from the light source and the light sensing device.
15. The apparatus of claim 1 further comprising a protective housing in which the light source and the light sensing device are disposed.

16. The apparatus of claim 1 wherein the light source provides the illumination along an illumination path, the light sensing device receives the reflected indicia image along a reflected image path, and wherein an included angle between the illumination path and the reflected image path is no greater than about two degrees.
17. The apparatus of claim 1 further comprising:
the light sensing device for generating the indicia image signal as a bit-mapped image of the indicia; and
the indicia processing system for receiving the bit-mapped image and for operating on the bit-mapped image to extract the indicia information therefrom.
18. The apparatus of claim 1 wherein the indicia further comprise a bar-code.
19. The apparatus of claim 1 wherein the reflective medium further comprises a retro-reflective material.
20. The apparatus of claim 1 wherein the light sensing device is operable to receive the reflected indicia image and generate the indicia image signal, and the indicia processing system is operable to operate on the indicia image signal to extract the indicia information as the reflective medium is moving relative to the light source and the light sensing device.
21. The apparatus of claim 20 wherein the reflective medium is operable to be disposed on a motor vehicle, a railroad car, or a cargo container.
22. An apparatus for reading indicia from a remote location, comprising:
an infrared light source for providing pulses of infrared illumination;
a reflective medium disposed remotely from the light source, the reflective medium including indicia operable to reflect the pulses of infrared illumination provided by the light source, where portions of the illumination reflected from the indicia comprise a reflected indicia image;

a camera incorporating charge-coupled devices which is
disposed remotely from the reflective medium,
sensitive to the infrared illumination reflected from the indicia,
10 electronically shuttered in synchronism with the pulses of infrared
illumination provided by the light source,
for receiving the reflected indicia image and for generating a bit-mapped
indicia image based on the reflected indicia image; and
an indicia processing system for receiving the bit-mapped indicia image and for
15 operating on the bit-mapped indicia image to extract indicia information
therefrom.

23. An apparatus for reading a bar code from a remote location, comprising:
a light source for providing illumination from a fixed location;
a retro-reflective medium operable to be disposed on a vehicle or container which is
remote from the light source and which is moveable relative to the light
5 source, the retro-reflective medium including the bar code which is operable
to reflect the illumination provided by the light source, where portions of the
illumination reflected from the bar code comprise a reflected bar code image;
a light sensing device disposed at the fixed location for receiving the reflected bar
code image and for generating a bar code image signal based thereon; and
10 a bar code processing system for receiving the bar code image signal and for
operating on the bar code image signal to extract bar code information
therefrom as the retro-reflective medium is moving relative to the light source
and the light sensing device.